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**REMARKS**

This is in response to an Office Action in the above identified application dated 8 December. The Applicants have attached a Petition for Extension of Time to Respond. The Applicants have included a payment of \$490 as a Large Entity.

The Examiner has rejected Claims 60-72 under 35 USC 103 as being unpatentable under one or more references.

Amended Claim 60 and new claim 73 recite that the product of the method is a porous material and that the result of the pyrolysis step is a strong form-stable carbonized material having the shape of the form-stable solid product and in which the phenolic resin is decomposed to porous carbon.

It is believed that these amendments further clarify the way in which the present process works, which is neither disclosed in nor suggested by any of the references cited by the examiner.

The first stage of the present process is to make a form-stable shaped solid product held together by a sintered resin binder. Partially cured but sinterable resin is ground into powder, which is mixed with particles of a secondary material that remains under pyrolysis and does not shrink during pyrolysis. The secondary material can be any powdered solid which is not adversely affected by the sintering process or which interferes unacceptably with the resin. Secondary materials which can be used include, but are not limited to, activated carbon powder, graphite, metals, metal and inorganic oxides and mixtures thereof. Optionally there is also present powder of uncured novolak resin and cross-linking agent, the examples in the subject application illustrating both possibilities. The product is shaped and sintered to give a form-stable shaped solid product based on porous cured resin powder which creates a cage structure that retains the secondary component or components without in any way changing the porosity of the second component(s). However, the cured resin product is only an intermediate which is then carbonised, during which step the sintered resin structure shrinks substantially (-40% by volume). It would be expected that the cage structure would be destroyed during carbonization because the secondary component which does not shrink would be expected to impose intolerable internal stress on the gradually forming porous carbon which is a brittle material.

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However, this does not happen and unexpectedly the cage structure is preserved during sintering giving a form stable carbonised product having the shape of the form-stable cured resin product and in which the phenolic resin is decomposed to porous carbon (i.e. there is porosity in the carbon corresponding to the previous porosity of the sintered particles of resin which do not melt during carbonization). There is nothing in any of the cited references that discloses or suggests that carbonization of a material forming within this particular genus would give rise to a useful product, there was no rational basis for predicting that this would happen, and the only way of finding out whether the present process was workable was to carry out the necessary experiment.

The claims previously on file were rejected over Satchell, Blackburn (WO 03/008068; PCT/GB 02/003259) and Krause.

The Examiner continues to reject Claims 60-63, 65-67, 69, 71-72 under 35 U.S.C. 103(a) as being unpatentable over Satchell (EP 0254551) in view of PCT/GB 2002/003259 and Krause (US 4,220,553).

Satchell and Blackburn disclose a method for producing a shaped porous adsorbent material which comprises: partially curing a phenolic resin to a solid that when ground can be sintered but that on carbonization does not melt; grinding the solid into resin particles; adding liquid to the mixture and forming the mixture into a dough; shaping the dough and sintering it to give a form-stable shaped solid product; and pyrolysing the form-stable shaped solid product by heating to a carbonization temperature to give a form stable material having the shape of the form-stable solid product and in which the phenolic resin is decomposed to porous carbon. However, neither reference either discloses or suggests that the process can be carried out in the presence of a secondary component that does not shrink during pyrolysis.

Krause is concerned with the production of core blocks for refrigeration systems in which adsorbents (which correspond to the secondary component in the present invention) are bound by a two-part binder comprising a phenolic resin and a polyisocyanate in which the binders are cured by passing alkaline gas through the block (the binder corresponding to the phenolic resin in the present invention). In the specific description, Krause refers to a filter block 22 comprising adsorbent particles of materials such as activated carbon, silica gel alumina gel, zeolite molecular sieves, etc. bound together so as to form a solid block by a mixture of two binder materials, namely a phenolic resin and a polyisocyanate. The adsorbent particles comprise from about 86.5% to about 97% by weight of the finished block. The binders fill only a very small portion of

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the interstitial space between the adsorbent particles to render the block very porous so that fluid may pass therethrough with a relatively low drop in pressure.

In a general procedure for making the block:

(a) Dry adsorbent material 40 from a hopper 41 is mixed with a phenolic resin 43 from container 44 and a polyisocyanate 46 from container 47 in a continuous blender 48.

(b) The mixture is delivered to a core blower 50 that blows the mixture into individual molds 51 to form core block 20.

(c) An alkaline gas from a source 53 is then passed through the core blocks to set the binders.

(d) The core blocks are then removed from the molds and transferred to an oven 58 and heated to remove the solvents in the core block. The block is then permitted to cool and is stored in a hermetically sealed container until used. Heating the core blocks also improves the strength of the block and increases its resistance to spalling.

In example 1 the adsorbent is alumina gel, the resin is a phenol formaldehyde resol and a diphenol methane diisocyanate type polyisocyanate resin, curing is by dimethylethylamine, and there is a post-curing solvent removal step at 232°C (450°F). In example 2 the adsorbent is activated carbon, in example 3 it is zeolite, in example 4 it is silica gel and in example 5 it is again activated carbon.

There is no disclosure or suggestion whatsoever in Krause to heat a block above the temperature for solvent removal. Heating it to a temperature where the binder resin decomposes or becomes carbonised would be contrary to the teaching of Krause which relies on the cured binder to hold the particles of adsorbent together. Furthermore there is no disclosure or suggestion that the binder would effectively hold the particles of adsorbent together after it had decomposed, and the skilled person would be deterred from decomposing the binder because he would consider the most likely result of decomposing the binder would be to destroy the block, as indeed would be expected to happen because the binder is not porous and there is no means of escape for the evolved gas which would act as an internal blowing agent for the binder which would destroy its structure. It is therefore not apparent that a combination of the teachings of

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Satchell or Blackburn or both of them with Krause would lead a skilled person to the invention now claimed.

The Examiner rejected Claims 60-63, 65-67, 69, 71-72 under 35 U.S.C. 103(a) as being unpatentable over Satchell (EP 0254551) in view of PCT/GB 2002/003259, further in view of Van der Smissen (US 4,677,096). The examiner is of the opinion that Van der Smissen teaches impregnation with aluminium or copper, but the reference at column 2 lines 43-44 is to copper oxide and aluminium oxide. At column 2 lines 51-59, activated carbon is impregnated with an aqueous solution of a zinc salt with a volatile acid, which is converted by heating to zinc oxide. There is no disclosure or suggestion of solid particles of copper or aluminium as alleged. Van der Smissen fails to disclose or suggest the use of a second component as solid particles and therefore fails to disclose or suggest the invention even when read in combination with the disclosure of Satchell and/or Blackburn.

The Examiner rejected Claims 70 and 63 under 35 U.S.C. 103(a) as being unpatentable over Satchell (EP 0254551) in view of Blackburn (PCT/GB 2002/003259) and Krause (US 4,220,553), and further in view of Noack (US 7,014,681). The Nocek reference is primarily concerned with the production of flexible porous membranes and adsorbents. The present invention is not concerned with the production of flexible membranes but instead is concerned with the production of form-stable shaped products. Nocek nowhere discloses partially curing a phenolic resin to a solid and grinding that solid. It nowhere discloses mixing the resin particles with solid particles of a secondary component that remains after pyrolysis. The silicon carbide referred to at column 10 lines 51-54 is formed in situ during pyrolysis and is not employed as a pre-existing particulate material. It does not disclose adding liquid to the mixture to form dough, shaping the dough and sintering the dough. Still less does it disclose that the resulting form-shaped solid product can be pyrolysed to give a strong form stable material having the shape of the form-stable solid product and in which the phenolic resin is decomposed to porous carbon. The relationship between the invention defined by the claims as amended and the Nocek disclosure is at best marginal and it is not apparent how the disclosure of Nocek can be combined with the disclosures of the earlier cited references to arrive at the presently claimed process.

The Examiner rejected Claims 64 and 68 under 35 U.S.C. 103(a) as being unpatentable over Satchell (EP 0254551) in view of Blackburn (PCT/GB 2002/003259) and Krause (US 4,220,553), and further in view of Chen (US 5,882,517). The teaching of Chen is summarised at

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column 3 lines 10-25 and is directed towards a process for the manufacture of porous structures by:

forming a dry mixture comprising a component providing primary separation capability, a component providing green strength and a component providing binding capability and selected from the group consisting of thermoplastic and thermosetting polymers;

delivering the mixture to a suitable surface and building a desired thickness thereof;

densifying the mixture into the form desired for the porous structure;

removing the desisfied porous structure from the surface; and

binding the component providing the separation capability by heating the mixture to a temperature of up to about 20°C higher than the melting point of any thermoplastic component providing binding capability.

From the above it is apparent that the use of an organic binder is essential to the Chen process and therefore that reference is no more relevant than and merely cumulative to Nocek. Insofar as Chen is relied on to show the use of PEO, the teaching at column 6 lines 5-10 is to use it as a green strength agent. It is present at the uncarbonised resin stage in the applicant's process but is not beneficial as a strengthening agent for the carbonized structure as alleged at paragraph 37 of the Examiner's Office Action. The reference to graphite in Chen is to fibres which form part of a structure held together by a binder, which is essentially different to this invention.

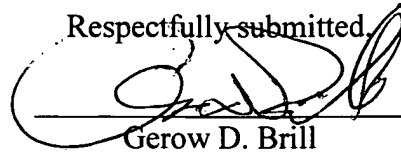
Since the grounds of objection are on the Examiner's own admission entirely new and newly cited references are relied on about which the applicants have had no previous opportunity to comment upon, it is submitted that the issue of a final rejection was premature. Reconsideration is requested.

As discussed above, the Applicant has amended Claim 60 and added new Claim 73 to achieve allowance by the Examiner of Claims 60 – 73. No addition claim fee is required. The Applicant requests that the Examiner reconsider the allowance of Claims 60-72 and consider the allowance of new claim 73.

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The Applicants submit that the new claims are in form for Allowance. Based on these Remarks, the newly added claims the Applicants respectfully request reconsideration of the Application.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Gerow D. Brill", is written over a horizontal line.

Gerow D. Brill  
Counsel for Applicant  
Registration No. 34554

Law Office of Gerow D. Brill  
20 Oakmont Circle  
New Freedom, PA 17349  
Telephone: (717) 235-1849  
Fax: (717) 235-1899

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